

**REMARKS**

Restriction Requirement

The courteous telephone interview granted Applicants' undersigned attorney on August 11, 2003 is respectfully acknowledged. As discussed on the telephone with Examiner Oh, Applicants respectfully traverse the final restriction requirement and request rejoinder of the claims of Group I and II (claims 1-76 and 93-101) for the reasons set forth below.

Groups I and II

In response to the restriction requirement of November 20, 2002, Applicants provisionally elected the claims of Group I (Claims 1, 15-18, 23-31, 46-49, 60-66, 74-76, 93 and 98-101) for prosecution on the merits. The claims of Group I are directed to a process for the preparation of a carboxylic acid salt by dehydrogenating a primary alcohol in the presence of a dehydrogenation catalyst comprising a copper-containing active phase at the surface thereof. Claims 2-14, 19-22, 32-45, 50-59, 67-73, 78-81 and 94-97, which were restricted to Group II, are also directed to a process for dehydrogenating a primary alcohol in the presence of a dehydrogenation catalyst comprising a copper-containing active phase. In fact, each of the claims of Group II depend from claims of Group I and simply further define the claimed process with respect to the dehydrogenation catalyst employed. Therefore, it is respectfully submitted that the claims of Group I and Group II are neither independent nor distinct such that restriction under 35 U.S.C. §121 is improper.

Claims 78-81, which were originally restricted to Group II, have been withdrawn. Accordingly, rejoinder of claims 1-76 and 93-101 is hereby respectfully requested.

Group III

Applicants have not traversed the restriction with respect to Group III. Accordingly, claims 77 and 82-92 are withdrawn from consideration.

Claims 140-168

Applicants respectfully acknowledge the Examiner's rejoinder of claims 140-168 with the claims of non-elected Group VI.

Amendments to the Specification

The first paragraph of the specification has been amended to indicate that the parent application, U.S. Patent Application Serial No. 09/547,373, has issued as U.S. Patent No. 6,376,708.

Claim Amendments

Claims 7, 11, 34, 54 and 77 as amended are in proper Markush form. The amended claims are supported by the claims as originally filed. No new matter has been added.

Claims 77-92 are withdrawn. Applicants reserve the right to pursue the subject matter of claims 77-92 in a divisional application.

Applicants have cancelled claims 102-168 without prejudice. Claims 102-168 correspond to non-elected Groups IV, V, and VI in the restriction requirement dated November 20, 2002. Applicants reserve the right to pursue the subject matter of claims 102-168 in a divisional application.

Rejection under 35 U.S.C. §112

Claims 1 and 93 are rejected under 35 U.S.C. §112, first paragraph for lack of enablement. For the reasons set forth below, Applicants respectfully traverse the rejection. Reconsideration and withdrawal of the rejection is respectfully requested.

As a matter of Patent Office practice, a specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond to those used in describing and defining the subject matter sought to be patented must be taken as in compliance with the enabling requirement of the first paragraph of §112 unless there is reason to doubt the objective truth of the statements contained therein

which must be relied on for enabling support. In re Marzocchi, 439 F.2d 220, 169 USPQ 367, 370 (CCPA 1971); see also MPEP §2164.04. Furthermore, "it is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain why it doubts the truth or accuracy of any statement made in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. Id., 169 USPQ at 370. Thus, the burden rests upon the Office to establish a *prima facie* case of nonenablement, which requires the Office to provide acceptable evidence or reasoning inconsistent with the contested statements. Id.; see also In re Strahilevitz, 668 F.3d 1229, 1232 (CCPA 1982). The Office has not met this burden.

On page 4 of the Office action, the Examiner asserts that "there is no certainty that all the salts of carboxylic acids can be equally produced under the claimed reaction conditions and the reaction parameters." Such a conclusive assertion falls far short of acceptable evidence or reasoning to question the applicability of Applicants' process as disclosed and claimed. Nowhere does the Examiner articulate any objective basis upon which one skilled in the art would question the suitability of Applicants' process to produce the wide range of carboxylic acids from primary alcohols as claimed. Nor does the Office action provide any explanation why the reaction parameters disclosed by Applicants would not produce carboxylic acid salts from primary alcohols as claimed.

Despite the failure of the Office to meet its burden, Applicants nevertheless submit that the specification fully meets the requirements of 35 U.S.C. §112, first paragraph because the combination of specific examples and general teaching of the specification along with knowledge common to those skilled in the art would fully enable a person of ordinary skill in the art to practice the process as claimed without undue experimentation. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Rejection under 35 U.S.C. §103(a)

Reconsideration is respectfully requested of the rejection of claims 1, 15-18, 23-31, 46-49, 60-66, 75-76, 93 and 98-101 under 35 U.S.C. §103(a). In view of the traversal of the restriction requirement between Groups I and II as described above, Applicants have addressed their remarks under 35 U.S.C. §103(a) to claims 1-76 and 93-101. For the reasons set forth below, claims 1-76 and 93-101 are submitted as patentable over Siebenhaar et al., International Publication WO 00/32310, in view of Franczyk et al., U.S. Patent No. 5,739,390.

Applicants respectfully submit that the cited references, taken alone or in combination, fail to establish a *prima facie* case of obviousness with respect to the process as defined in the pending claims. In order to establish a *prima facie* case of obviousness, the Patent Office must establish, among other things, that there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. The Patent Office must also establish that the reference, or references when combined, teach or suggest all of the claim limitations. As detailed below, the cited references fail to establish a *prima facie* case of obviousness with respect to the rejected claims.

Claims 1-48

The present invention is directed to an improved liquid-phase process for preparing carboxylic acid salts by dehydrogenating primary alcohols in the presence of a copper-containing catalyst. For example, as defined in claim 1, the process of the present invention requires contacting an alkaline mixture comprising a primary alcohol with a catalyst comprising a copper-containing active phase at the surface of a supporting structure that is resistant to deformation under the conditions of the dehydrogenation reaction. Applicants have discovered that the dehydrogenation of primary alcohols may be made more

economical by using a dehydrogenation catalyst comprising a copper-containing active phase deposited on a supporting structure that is resistant to deformation under the conditions of the dehydrogenation reaction. In particular, such a supporting structure has been found to provide strengthening characteristics to a dehydrogenation catalyst comprising copper such that the catalyst has a higher surface area, higher activity, and maintains its activity over extended use in the dehydrogenation reaction.

Generally, traditional processes for dehydrogenating primary alcohols with copper-containing catalysts, especially copper sponge (i.e., Raney copper) catalysts, have suffered from low productivity and/or high catalyst costs. For example, such traditional catalysts tend to deform and lose surface area and the catalyst particles themselves tend to agglomerate as the catalyst is used, particularly in mechanically-stirred liquid reaction mixtures. Both the loss of surface area and the agglomeration of the catalyst particles reduce the activity of the catalyst. Applicants have discovered, however, that the rate of deactivation can be slowed significantly by depositing a copper-containing active phase at the surface of a supporting structure that is resistant to deformation under the conditions of the dehydrogenation reaction as required by claim 1. Applicants have found that the use of a copper-containing active phase at the surface of a mechanically-strong supporting structure provides a distinct advantage in practicing the process of the present invention wherein catalyst activity can be maintained for a longer period of time, thereby reducing the amount of fresh catalyst required per amount of carboxylic acid salt produced.

The principal reference, Siebenhaar et al., International Publication No. WO 00/32310, describes a process for preparing amine-group-containing carboxylic acid salts by oxidizing amine-group-containing primary alcohols in an aqueous alkaline medium in the presence of a modified Raney copper catalyst. Siebenhaar

et al. describe treating the Raney copper catalyst with a promoter such as boric acid, onium fluorides or salts with fluorine complex anions, or heteropoly acids to increase catalyst activity, maintain catalyst selectivity and decrease catalyst deactivation over multiple reaction cycles. However, nothing in the reference discusses improving the mechanical strength of the Raney copper catalyst or suggests using a supporting structure that would be resistant to deformation under the conditions of the dehydrogenation reaction. Rather, Raney copper catalysts as described by Siebenhaar et al. are known to deform under the conditions of the dehydrogenation reaction as taught by Applicants in their specification (See generally page 2, line 26 to page 3, line 2 of Applicants' specification). Further, nothing in the reference remotely suggests the loss of catalyst activity due to catalyst agglomeration or the softness of copper that would lead one to produce a stronger copper catalyst, much less to incorporate a copper-containing active phase onto the surface of a supporting structure resistant to deformation under the conditions of the dehydrogenation reaction. Because Siebenhaar et al. only describe Raney copper supporting structures, the reference cannot be said to provide any teaching or motivation for one skilled in the art to select a more durable dehydrogenation catalyst in accordance with the present invention.

It is further respectfully submitted that the deficiencies of the principal reference cannot be overcome by resort to the teachings of Franczyk et al., U.S. Patent No. 5,739,390.

Franczyk et al. describe the dehydrogenation of a primary alcohol with an alkaline metal hydroxide in the presence of a Raney copper catalyst having from 10 to 50,000 parts per million of an additional metal selected from the group consisting of bismuth, tin, antimony, lead, germanium and mixtures thereof. Although Franczyk et al. describe maintaining catalyst activity by including small amounts of additional metals onto a Raney copper catalyst, the reference is not concerned with the

mechanical strength and physical durability of the copper-containing catalyst as such, nor would the doped Raney copper catalysts be resistant to deformation under the conditions of the dehydrogenation reaction. Rather, the doped copper sponge catalyst of Franczyk et al. suffers from the same limitations as described above with respect to the catalyst of Siebenhaar et al. The cited references are merely cumulative in offering alternative strategies for improving the activity of dehydrogenation catalysts comprising copper sponge supporting structures, without any mention of a supporting structure resistant to deformation under the conditions of the dehydrogenation reaction. Nothing in the references remotely teaches or suggests reducing the rate of catalyst deactivation by maintaining the physical durability of the catalyst or any method by which one skilled in the art could do so. Accordingly, it is respectfully submitted that the cited references, either singly or in combination, fail to teach the catalyst employed in the process defined claim 1 and cannot establish a *prima facie* case of obviousness with respect to claim 1. Claims 2-48, which depend directly or indirectly from claim 1, are respectfully submitted as patentable over the cited references for the reasons set forth above with respect to claim 1.

Claims 49-76

Claim 49 is directed to an embodiment of the present invention wherein the more mechanically durable dehydrogenation catalyst used in the process of the present invention comprises a metal sponge comprising a copper-containing active phase at the surface thereof and a supporting structure that contains at least about 10% by weight non-copper metal. Because neither of the references describe the use of a mechanically durable dehydrogenation catalyst as detailed above with respect to claim 1, Applicants respectfully submit that claim 49 is patentable over Siebenhaar et al. and Franczyk et al. More specifically, neither of the cited references teaches or suggests the use of a

catalyst supporting structure comprising at least about 10% by weight non-copper metal. Siebenhaar et al., describe maintaining the activity of a Raney copper catalyst. Nothing in the principal reference describes the use of a catalyst having a supporting structure comprising at least 10% by weight of a non-copper metal. Although Franczyk et al. describe doping the copper sponge catalyst with as much as 50,000 ppm (*i.e.*, 5%) of a metal selected from the group consisting of bismuth, tin, antimony, lead, germanium and mixtures thereof, the reference is entirely devoid of any suggestion or discussion of adding metals to the catalyst in an amount sufficient to enhance the mechanical durability of the catalyst structure. Accordingly, Applicants respectfully submit that Siebenhaar et al. and Franczyk et al. cannot establish a *prima facie* case of obviousness with respect to the process defined in claim 49. Claims 50-76, which depend directly or indirectly from claim 49, are respectfully submitted as patentable over the cited references for the reasons set forth above with respect to claim 49.

#### Claims 93-101

Claim 93 is directed to another embodiment of the present invention wherein the more durable dehydrogenation catalyst used by the process of the invention is characterized as being formed by a process comprising depositing a copper-containing active phase on the surface of a metal sponge support comprising at least about 60% by weight of a non-copper metal and about 2% to about 30% by weight copper. As described above with respect to claims 1 and 49, Applicants respectfully submit that claim 93 is patentable over Siebenhaar et al. and Franczyk et al. As described above, the cited references do not teach or suggest the use of a mechanically durable dehydrogenation catalyst for the dehydrogenation of primary alcohols. More particularly, neither reference remotely describes the use of a metal sponge support comprising at least about 60% by weight of a non-copper metal and about 2% to about 30% by weight copper. Thus, it is respectfully



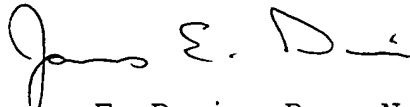
submitted that claim 93 and claims 94-101 depending therefrom are likewise patentable over Siebenhaar et al. in view of Franczyk et al.

Conclusion

Favorable reconsideration and allowance of all pending claims are respectfully solicited.

Applicants request an extension of time to and including August 11, 2003 for filing a response to the above-mentioned Office action. A check in payment of the applicable extension fee is enclosed. The Commissioner is requested to charge any fee deficiency or overpayment in connection with this amendment to Deposit Account 19-1345.

Respectfully submitted,



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